

ABSTRACT OF THE DISCLOSURE

One or more machine code entities such as functions are created which represent solutions to a problem and are directly executable by a computer. The programs are created and altered 5 by a program in a higher level language such as "C" which is not directly executable, but requires translation into executable machine code through compilation, interpretation, translation, etc. The entities are initially created as an integer array that can be altered by the program as data, and are executed by 10 the program by recasting a pointer to the array as a function type. The entities are evaluated by executing them with training data as inputs, and calculating fitnesses based on a predetermined criterion. The entities are then altered based on their fitnesses using a machine learning algorithm by recasting 15 the pointer to the array as a data (e.g. integer) type. This process is iteratively repeated until an end criterion is reached. The entities evolve in such a manner as to improve their fitness, and one entity is ultimately produced which represents an optimal solution to the problem. Each entity 20 includes a plurality of directly executable machine code instructions, a header, a footer, and a return instruction. The instructions include branch instructions which enable subroutines, leaf functions, external function calls, recursion, and loops. The system can be implemented on an integrated 25 circuit chip, with the entities stored in high speed memory in a central processing unit.